HOMEWORK 10, CALCULUS AND LINEAR ALGEBRA, 2015/2016

Assigned 12/02/2015, due 12/09/2015, collected from 2pm to 2.15pm sharp!

Name and Family Name (CAPITAL LETTERS): _____

MATRICOLA N.: _____

Exercise 1

Consider the matrix $A = \begin{pmatrix} 1 & 0 & 1 \\ -2 & 1 & 0 \\ 3 & 2 & 0 \end{pmatrix}$.

a) Compute the determinant of A using the Laplace method.

b) If possible, compute the inverse matrix of A.

c) Using the matrix method, solve the following linear system

$$\begin{cases} x + z = 1 \\ -2x + y = -1 \\ 3x + 2y = 0 \end{cases}$$

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Exercise 2

Consider the matrix $A = \begin{pmatrix} 1 & 2 & 1 \\ 6 & -1 & 0 \\ -1 & -2 & -1 \end{pmatrix}$.

a) Compute the eigenvalues of A.

b) Compute the associated eigenvectors with length 1.

c) Consider the vector $\vec{v} = \frac{2}{\sqrt{6}} \begin{pmatrix} -1 \\ 2 \\ 1 \end{pmatrix} + \frac{1}{\sqrt{17}} \begin{pmatrix} 2 \\ 3 \\ -2 \end{pmatrix}$. Compute the product $A\vec{v}$ using the previous results.